

Module 4

Community Engagement and Resiliency Planning

Danielle Swallow
Planner, DNREC Delaware Coastal Programs

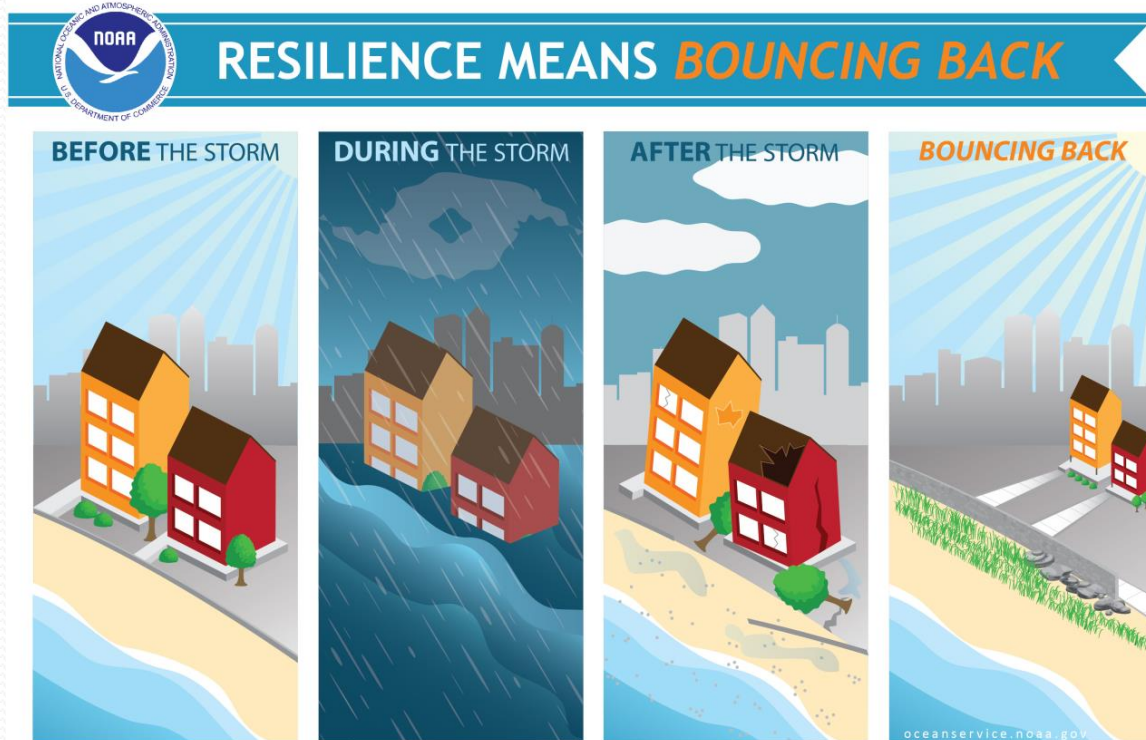
May 19, 2017

Definition of Coastal Resiliency:

The ability of a community to rebound after hazardous events like hurricanes and coastal storms.

Coastal resilience planning is ...
“anticipatory, conscious, and intentional in its outlook”*

*Timothy Beatley, “Planning for Coastal Resilience: Best Practices for Calamitous Times,” 2009



- Delaware communities are already vulnerable to hazards
- Significant time is required to motivate others and develop adaptive capacity, and then to implement changes
- Proactive planning is often more effective and less costly than reactive planning



Resiliency Planning in a Nutshell:

- Inventory infrastructure and assets
- Characterize existing and future hazards
- Identify and prioritize vulnerabilities
- Document mitigation and adaptation recommendations
- Implement recommendations and monitor progress

COLLABORATE & COMMUNICATE

Public Engagement

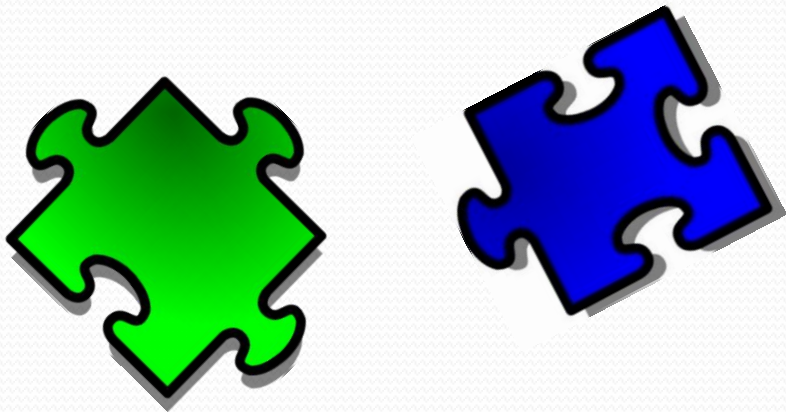
- Increases understanding and buy-in of risks, vulnerabilities, and the need for action
- Builds partnerships and momentum within a community
- Provides opportunities for coordination between different agencies and officials (ex: state emergency managers)



What Does Implementation Look Like?

Examples

- Open space management plans & land acquisition programs
- Comprehensive plans
- Zoning and building code updates
- Infrastructure design upgrades
- Floodplain management ordinances
- Hazard mitigation committees
- Emergency preparedness plans
- Outreach campaigns



Bioswale



Three Towns – Three Different Scales of Effort

You Can Customize the Scope and Scale of the Process To Suit Your Needs

- City of Seaford, DE
- Town of Slaughter Beach, DE
- Milford, DE

Seaford, DE

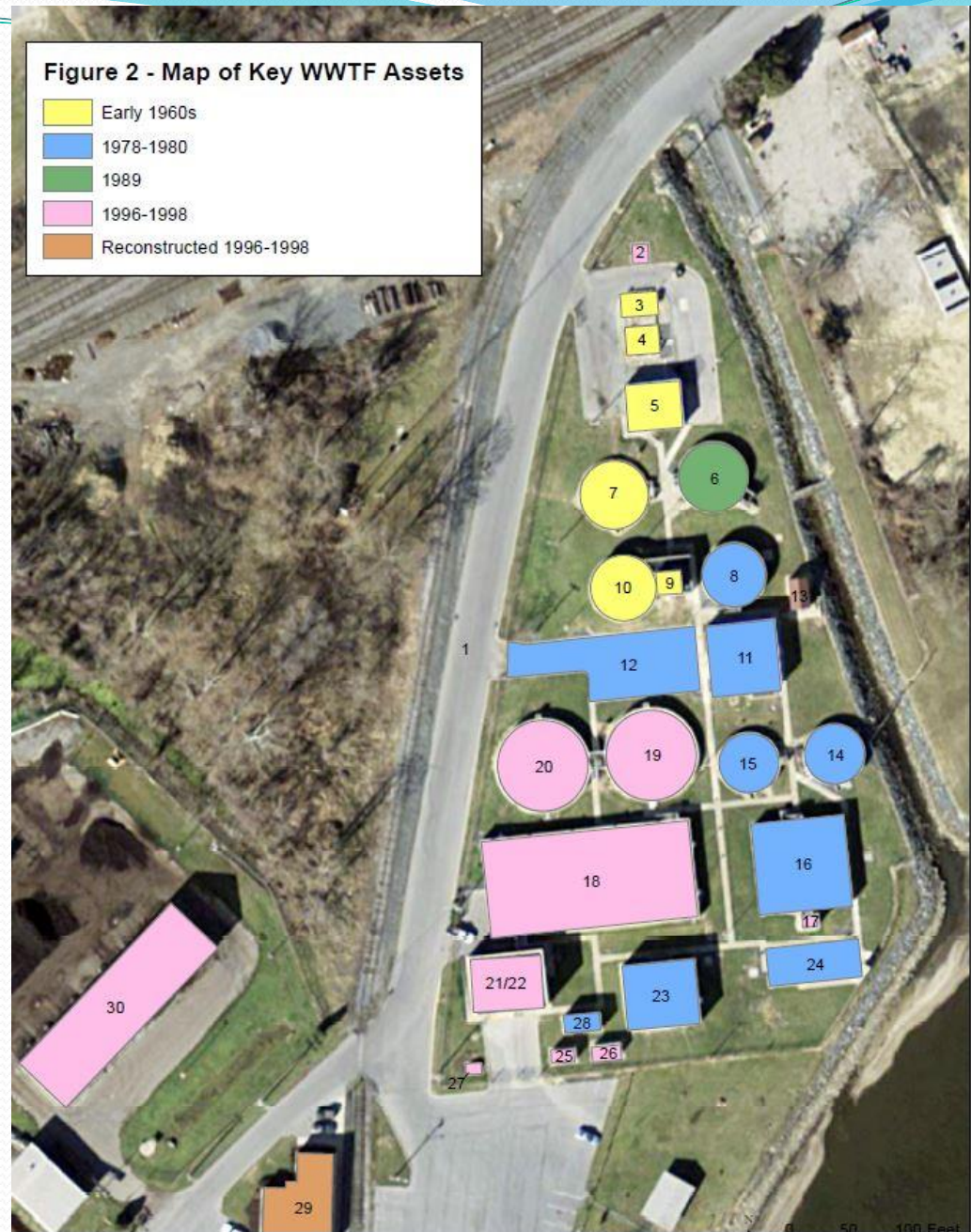
Project: Vulnerability Assessment of Wastewater Treatment Facility (WWTF)



- WWTF built in 1961 and located on the Nanticoke River
- Upgrade and expansion required by January, 2023
- Vulnerability Assessment needed to help inform the design of upgrades

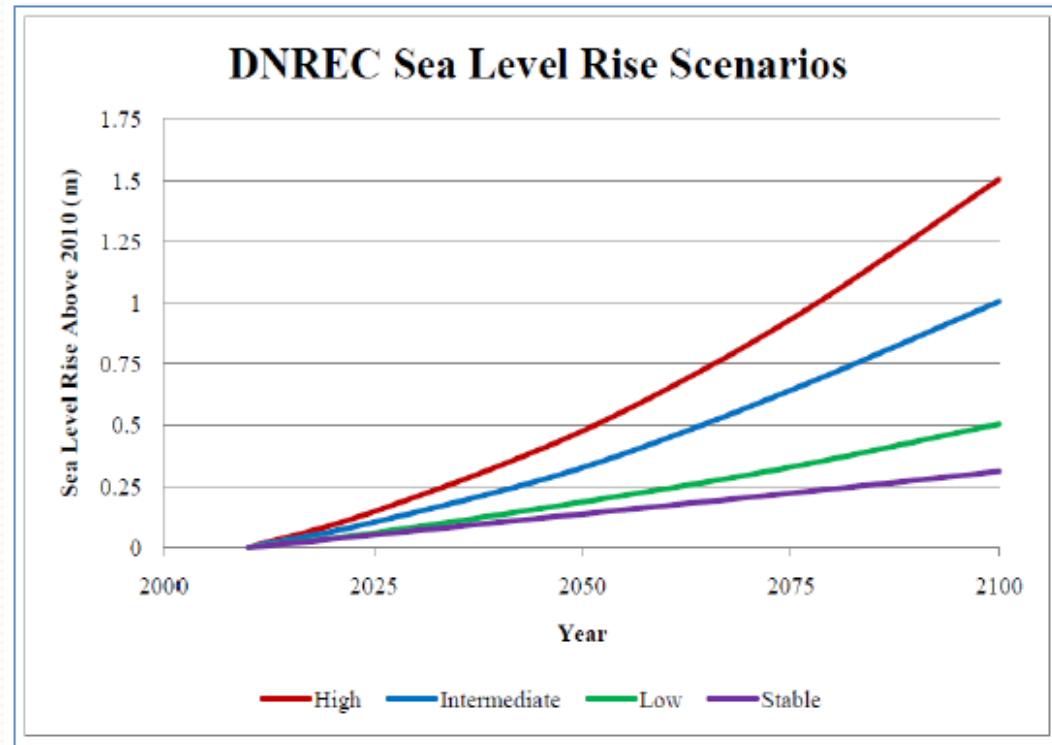
Task 1 - Inventory WWTF Structures

- Note the age, condition, elevation, etc. of structures

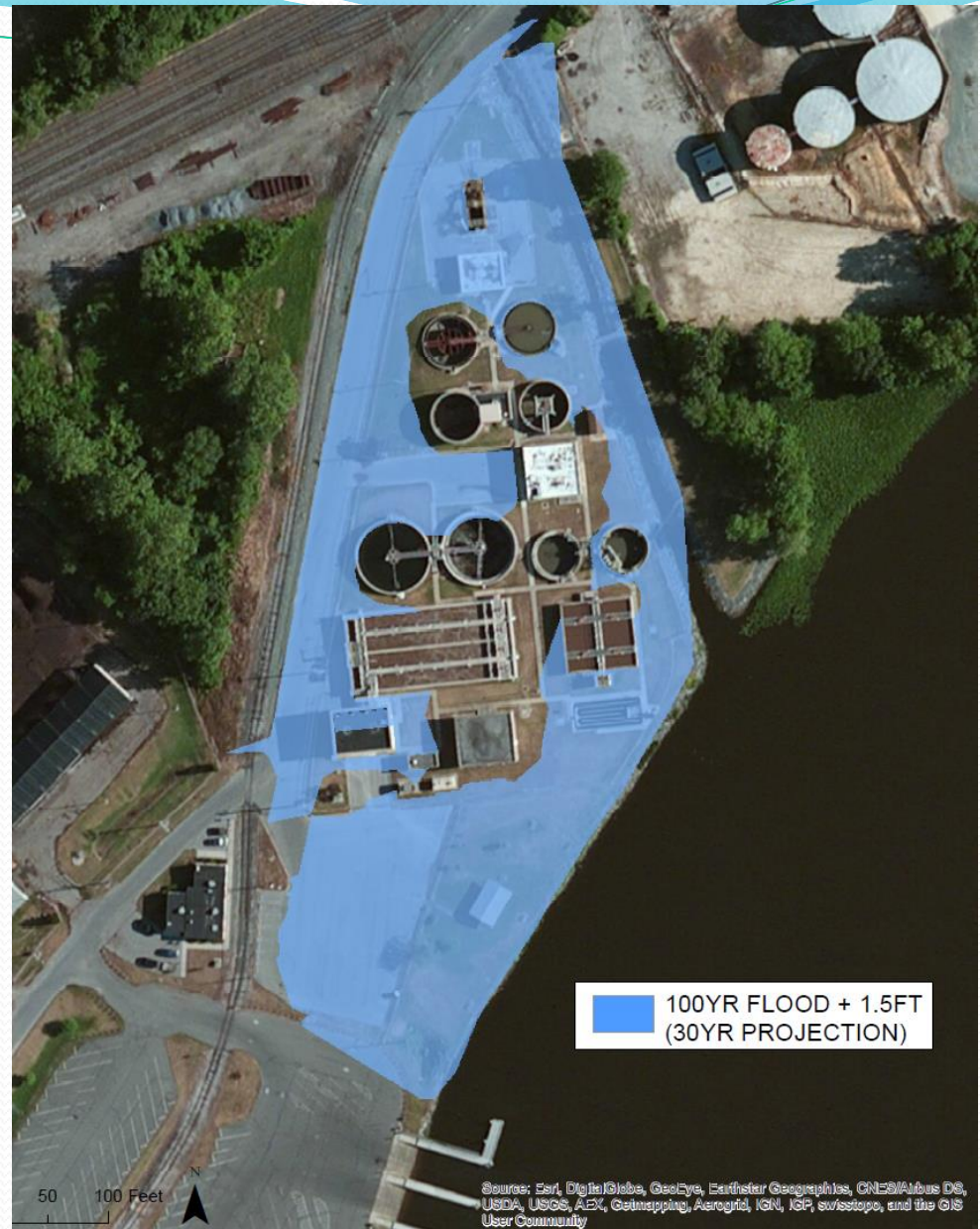


Task 2 - Understand and Characterize Risk

- Identify and characterize existing hazards
 - Example: FIRM maps, Town's experience with actual events
- Identify and characterize future hazards
 - Example: sea level rise planning scenarios



- Document impacts of each hazard on all prioritized assets
- Visualizations are effective at communicating risk to the public and decision-makers



Analysis prepared by GMB, LLC

Task 3 – Prioritization of Vulnerabilities

Seaford WWTF Vulnerability Study
Inventory of Key Assets

Figure 3

WWTF Asset	Survey Reference	Elevation	Sea Level Rise Inundation (measured in feet)			100-YR Flood Inundation (measured in feet)				Priority Rating
			0.5 m (35 Year)	1.0 m (60 Year)	1.5 m (85 Year)	Flood (2015)	Flood + 1.0' (20 Year)	Flood + 1.5' (30 Year)	Flood + 2.0' (40 Year)	
Nanticoke Ave - Plant Access Road	Grade	4 to 9+		0.45	2.09	2.00	3.00	3.50	4.00	3
Grit Chamber Bypass Vault	TOW	6.98					0.02	0.52	1.02	2
Headworks- Grit Chamber	TOW	8.37								
Headworks Bar Screen	TOW	8.37								
Primary Pumping Station-Ground Floor	FF	6.62					0.38	0.88	1.38	1
Primary Clarifier - East	TOW	12.47								
Primary Clarifier - West	TOW	12.47								
Flow EQ Tank - No. 3	TOW	17.11								
Sludge Building - Ground Floor	FF	9.99								

Task 4 – Identification of Adaptation & Mitigation Measures

Primary recommendations –

- Incorporate flood protection measures into the design of upgrades to safeguard the facility for next 20-30 yrs
- Relocation may be more prudent in the longer term as sea level rise continues upward

Examples of specific mitigation measures (for pump station) -

- Installation of flood proof doors (3 locations)
- Construction of a surrounding wall
- Placement of interior curbs to block water entry into the lower levels

Slaughter Beach, DE

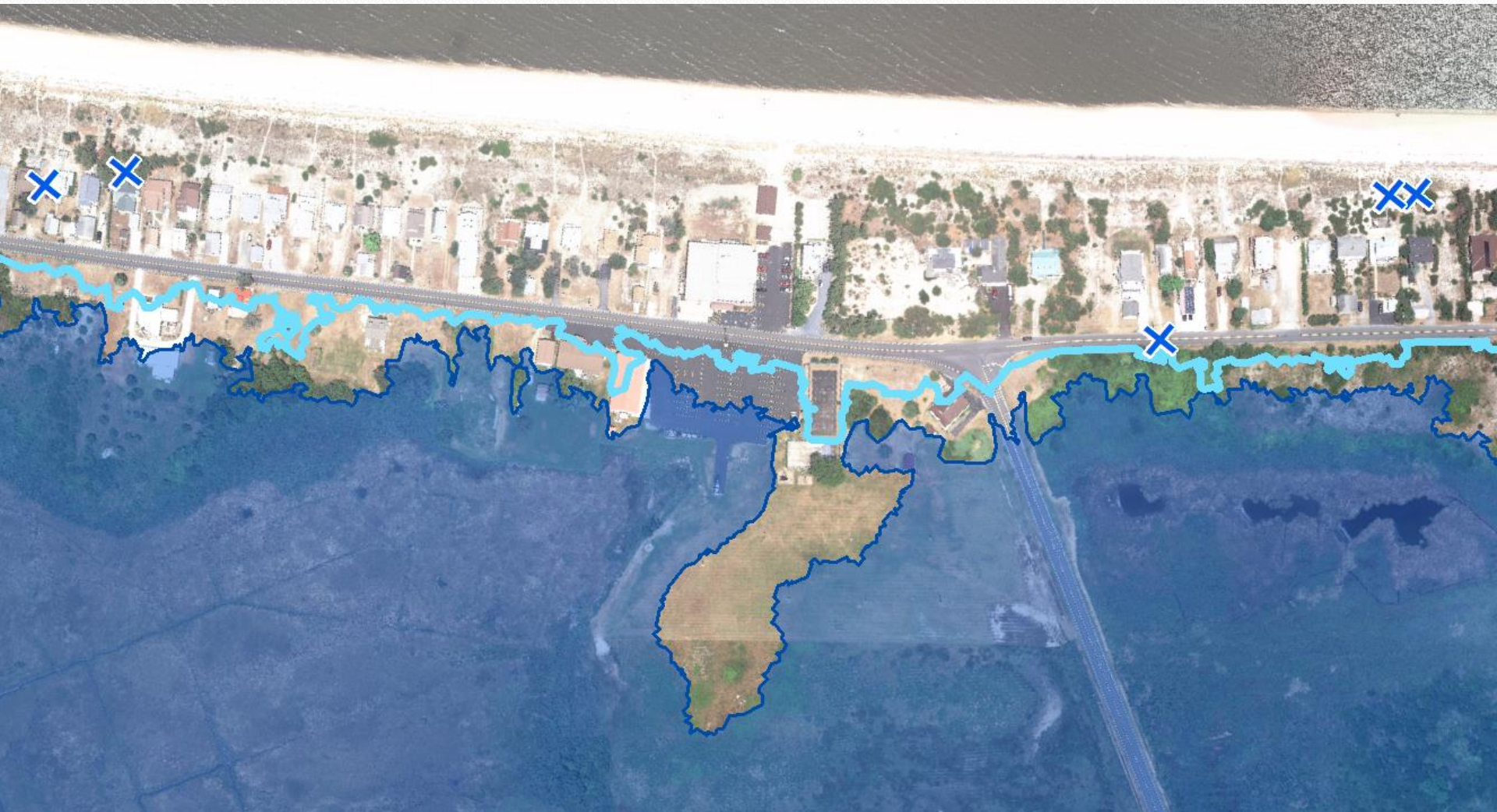
Project: Vulnerability Assessment of Town

Task 1 –Inventory of Infrastructure, Assets *and* Values

- What places, natural features, services, economic opportunities, and/or cultural aspects make the community a special place to live in, and why?
- What infrastructure and assets are critical to the continuity of Town operations and quality of life?



Task 2 – Understand and characterize risk



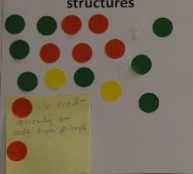

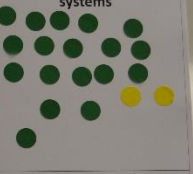



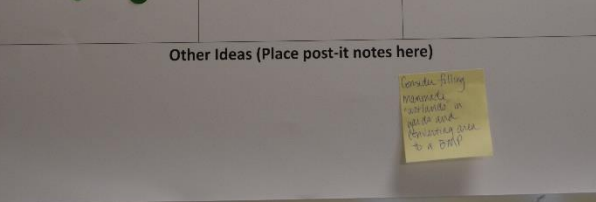
Task 3 – Prioritization of vulnerabilities

Task 4 – Brainstorm and Document Adaptation and Mitigation Options

Homeowner Adaptation Options
Accommodate

Within the next 20 years, would you *consider* using any of these adaptation options for your own property?

Please "vote" only once per box, with the corresponding sticky dot to indicate your response.
Green = Yes Yellow = Unsure/Need more information Red = No

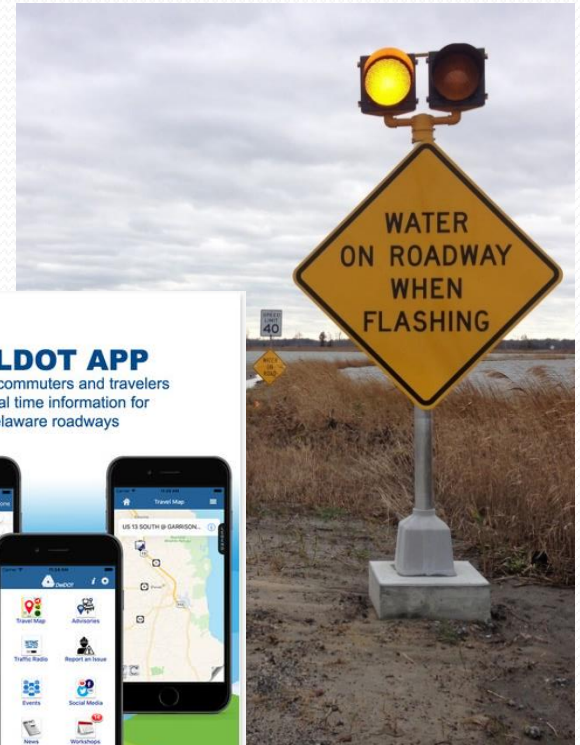
Elevate home and/or structures 	Elevate and secure utilities 	Use real-time warning systems 
Develop household emergency plans 	Use available cooling centers during excessive heat waves 	Install rain gardens to capture storm water 
Other Ideas (Place post-it notes here) 		

- Extensive public engagement
- Considered a range of options including “low hanging fruit”



Task 5 - Implementation

- Real time transportation warning system for evacuation routes
- Town initiative to secure propane tanks and other utility tanks
- Leadership, buy-in and partnerships are integral to implementation



Milford – Inundation Planning



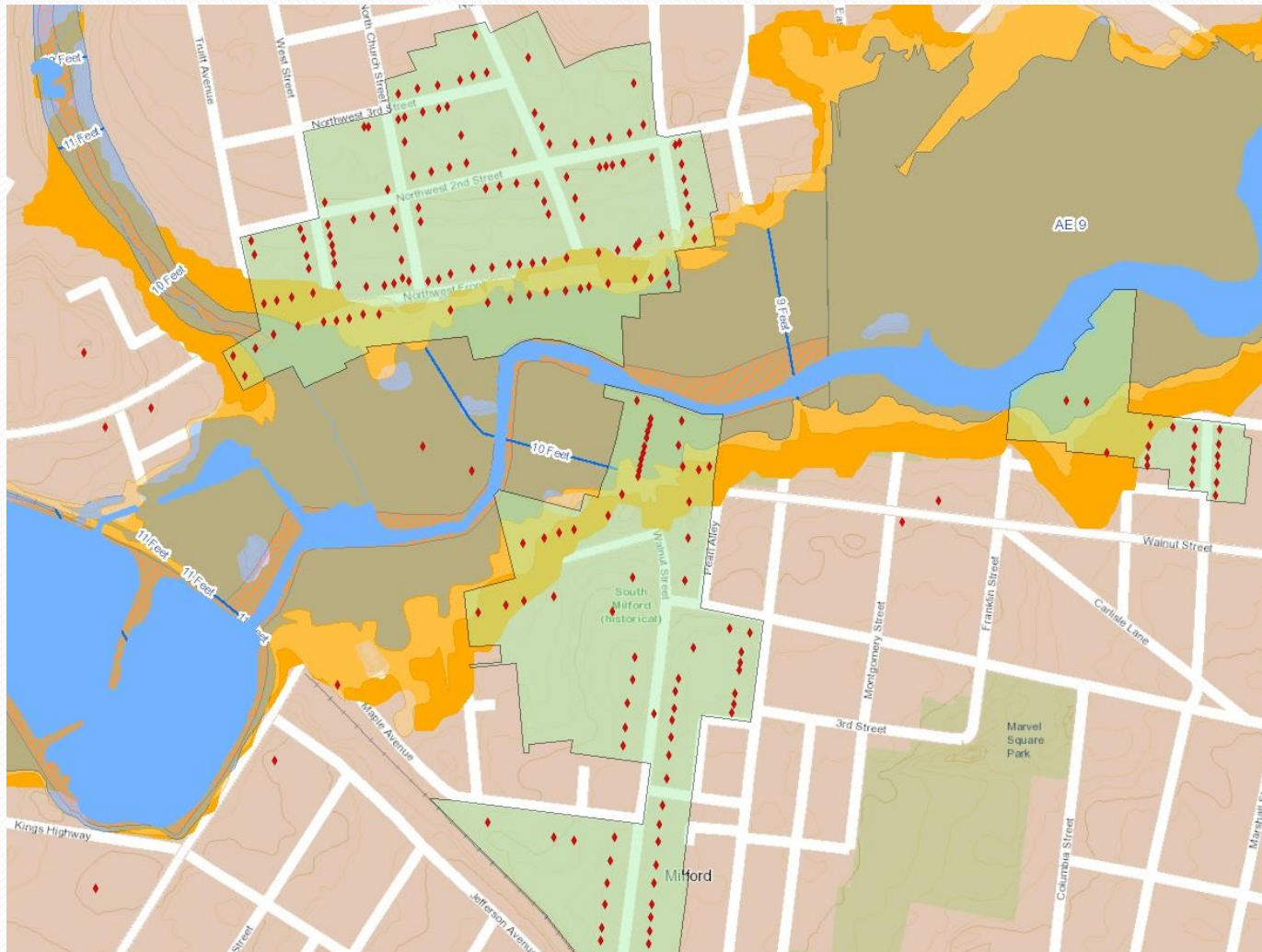
Task 1 & 2: Existing/Future Hazards

- Three Main Inundation Scenarios
 - FIRM – standard Flood Insurance Rate Map for the NFIP.
 - AE + A (100 year flood)
 - AE + A + 0.2 (500 year flood)
 - Delaware Sea Level Rise (SLR) Scenarios for 2100 using “bathtub” model
 - 0.5m rise (1’8”)
 - 1.0m rise (3’4”)
 - 1.5m rise (4’11”)
 - FRAM – Flood Risk Adaptation Map created by taking FIRM 100 year flood + 3 ft “bathtub” rise by 2100.
- Map these scenarios along with community assets to identify vulnerabilities

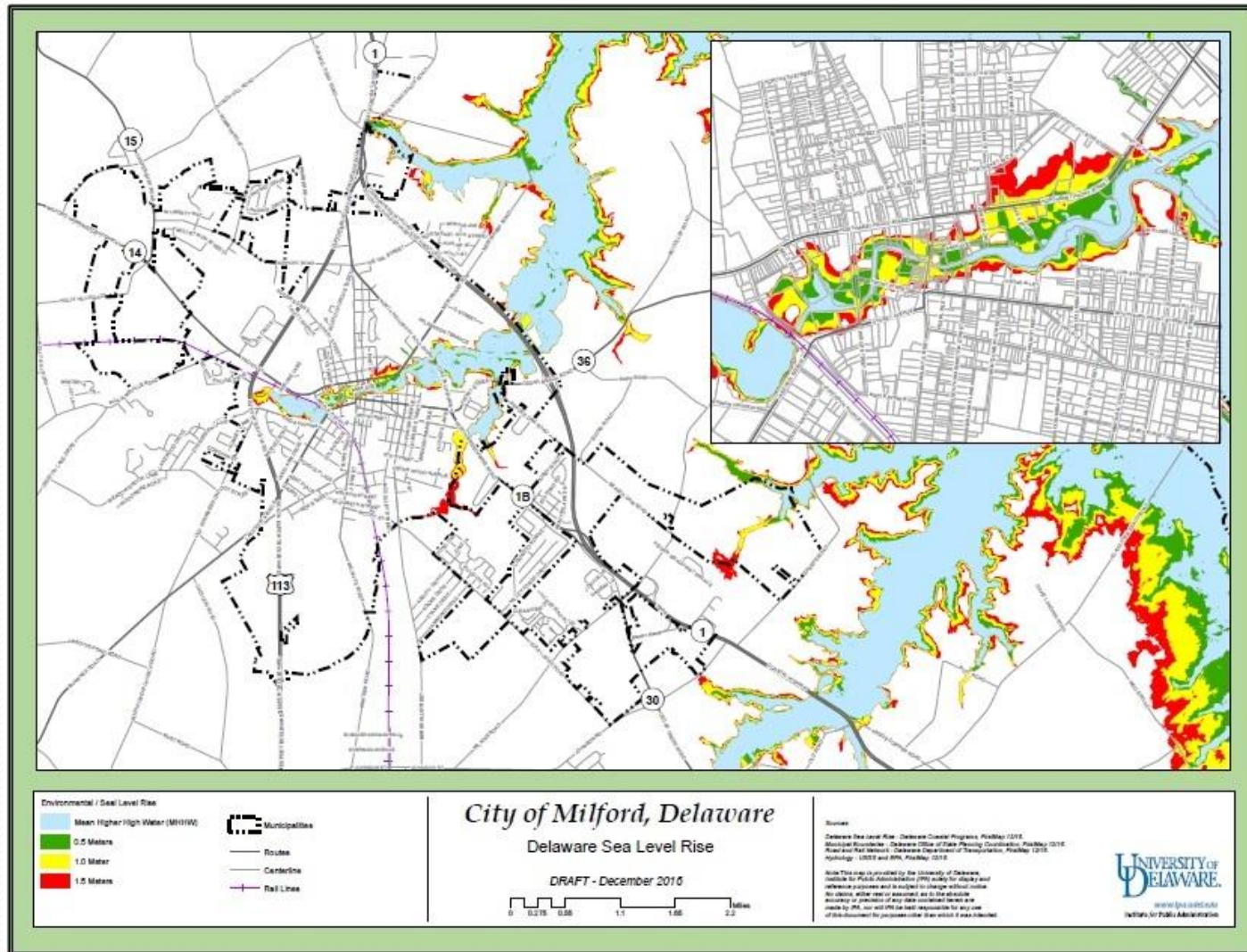
Task 1 & 2: Vulnerable Assets

Community Assets/Resources	FIRM		Delaware SLR			FRAM
	AE+A	AE+A+0.2	0.5m	1.0m	1.5m	
Roads (miles)						
Residential Land (% of total)						
Commercial Land (% of total)						
Land Area (acres)						
Historic District (% of total)						
Municipal Services (fire, police, school, library, cemeteries, municipal building, etc.)						
Downtown Development District (% of total)						
Evacuation Routes						

Task 3 – Assess Vulnerabilities



Task 3 – Assess Vulnerabilities



Task 4 – Adaptation Options

- Avoid development in areas vulnerable to inundation
- Flood proof historic properties using Historic Preservation Tax Credit
- Higher standards for construction (increase “freeboard”), especially in areas vulnerable to inundation
- Work with DelDOT to develop transportation adaptation plan
- Consider buyout programs for chronically flooded properties
- Green infrastructure for stormwater management, increase tree cover

Common Elements

- Look to the Past AND the Future
- Know the level of risk you want to plan to
- Document *all* vulnerabilities and prioritize
- Identify mitigation & adaptation options
- Consider low hanging fruit
- Engage decision makers and the public



Thank you!